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MEMORANDUM

TO Beverly Chenausky, Arizona Department of Transportation

FROM Bill Loudon, DKS Associates

DATE December 8, 2005

SUBJECT ADOT Project TPD04-04 Identification of Emissions Sources for Pinal County - Progress Report for the period between July 1, 2004 and November 30, 2005

Progress in the Reporting Period

Task 1 Define Geographical Scope and Analysis Parameters
A new task was negotiated for Unpaved Road Testing (Task 6) and the contract was amended adding $14,400.

Task 2 Assemble and Collect Data
No new activity in this task.

Task 3 Prepare and Analyze Emission Estimates
Emission estimates were developed for ozone precursor pollutants for two sets of long-range travel forecast: one from MAG and one for ADOT. The results were presented to the TAC on October 27.

The unpaved roads emissions and dispersion analysis was completed for PM_{10} and a spreadsheet model was completed and demonstrated at the TAC meeting on October 27.

Task 4 Prepare Project Reports
Project management activities occurred during this period and a progress report was prepared. A Technical Advisory Committee (TAC) meeting was held in Florence on October 27 and a summary of progress to date was provided.

A user's manual was prepared for the unpaved roads analysis spreadsheet tool.

Task 5 Prepare PM_{10} Attainment Plan Blueprint
There was additional analysis of Pinal County PM_{10} air quality data and additional review of the PM_{10} forecasting models used in other non-attainment areas

Task 6 Test Unpaved Road Treatment Control Effieieney
The data collection for this task was completed.

Plans for the Next Reporting Period (Winter 05/06)

Task 1 Define Geographical Scope and Analysis Parameters
No activity is planned in this task in the next reporting period.

Task 2 Assemble and Collect Data
No activity is planned in this task in the next reporting period.

Task 3 Prepare and Analyze Emission Estimates
Based on comments received on the PM_{10} analysis spreadsheet tool, revisions to the tool will be made and documented

Task 4 Prepare Project Reports
A progress report and invoice will be prepared and technical memoranda on the work in Tasks 2, 3, 4, 5 and 6will be prepared. A Final Report summarizing the conclusions from the project will also be prepared. A final TAC meeting will be held in early February 2006.

Task 5 Prepare PM_{10} Attainment Plan Blueprint
The analysis of Pinal County PM_{10} data and the review of PM_{10} forecasting models in other non-attainment areas will be completed. The Blueprint report will be completed.

Task 6 Test Unpaved Road Treatment Control Efficiency
The control efficiency of unpaved road treatments will be analyzed and reported.

Problems Encountered
No significant issues were encountered in this time period

Status Report
ADOT Project TPD04-04
August 2005 (Sierra Research)

During August, work on the unpaved road spreadsheet tool was completed. This included first completing the dispersion modeling for all meteorological databases using the CAL3QHCR model to replace the results generated by ISCST3 modeling in July. The ISCST3 model overestimated impacts at locations near to roadway edges because of its inability to deal accurately with wind flows parallel to roadway centerlines. Initial runs of CAL3QHCR showed that this model resolved these problems, and runs for all meteorological databases were then run. The output data for these runs were processed through a curvefitting program, and the resultant predictive equations were entered into the spreadsheet tool. The spreadsheets were then cleaned of extraneous data and calculations and formatted for ease of use.

A report describing the development and use of the spreadsheet tool was developed. The report discusses the goals of modeling, the selection of a computational methodology, the collection of site-specific meteorological and unpaved road soil data, the calculation of emissions factors, the modeling of plume dispersion, and the structure of the spreadsheet tool. A user instruction manual was also drafted as an attachment to the spreadsheet report.

A request was received from the Arizona Department of Transportation (ADOT) for assistance in determining the control efficiencies of dust palliatives applied to two unpaved state highways. Rough cost estimates for three analytical options were developed and forwarded to ADOT. Upon authorization to develop a proposal for one of the options, we collected information with respect to the project site and negotiated a contract with the University of California Riverside to conduct field testing of the treated roads.

Status Report
ADOT Project TPD04-04
September 2005 (Sierra Research)

During September, the report on the unpaved road spreadsheet tool was completed and submitted to ADOT. The report discusses the goals of modeling, the selection of a computational methodology, the collection of site-specific meteorological and unpaved road soil data, the calculation of emissions factors, the modeling of plume dispersion, and the structure of the spreadsheet tool. A user instruction manual was also prepared as an attachment to the spreadsheet report. Reviews of the report were completed by Sierra Researhc and DKS Associates prior to transmittal as a draft work product to ADOT.

Sierra also developed a testing program and negotiated a subcontract for evaluating the control efficiencies of dust palliatives applied to two unpaved state highways in the ADOT's Globe Maintenance District. Upon preliminary authorization from ADOT, we collected information on the specific highway links to be tested, developed a schedule for completing the work that met ADOT's goals, and negotiated a subcontract with the University of California, Riverside for conducting the needed testing. Sierra prepared and transmitted to ADOT a scope of work that would augment and enhance the current analysis of unpaved road emissions in Pinal County.

Status Report
ADOT Project TPD04-04
October 2005 (Sierra Research)

During October, the testing of unpaved road palliative effectiveness was conducted by University of California Riverside. Portions of two state highways, SR88 and SR288, were monitored by vehicle-mounted dust samplers while the vehicle was driven over road sections that were either treated with dust palliatives or were untreated. Fine particulate matter (PM_{10}) concentrations ahead of and behind the vehicle were continuously monitored using optical sensing technology and the locational coordinates of the vehicle were continuously monitored using a global positioning system. Signals from these instruments were continuously recorded by an on-board datalogger. Information on road treatment dates and average daily traffic counts were solicited and received from ADOT staff.

A methodology was developed to examine fleet-wide exhaust emissions rates in the portion of Pinal County outside Area A. Initial estimates of Pinal County emission rates were computed by contrasting differences in MAG emission and travel estimates for the 1-hour and 8-hour ozone nonattainment areas. The differences in these values were used to compute a g/mi emission rate for VOC and NOx in the donut area, which includes Pinal County. Given the disparity in the emission rates computed for the donut area and those of the 1-hour and 8-hour inventories, a separate method was developed to confirm the magnitude of the emission rates and the trends over time. This involved a search for information on the vehicle age distribution and related data needed to characterize MOBILE6 to represent Pinal County. Through contacts with different agencies, we were able to obtain previously prepared MOBILE5 input files for Pinal County from ADEQ. These files were converted to MOBILE6 inputs and used to generate runs for the years of interest. Sierra also prepared charts illustrating the relationship between pollutant/speed relationships for NOx and VOC.

A presentation on the work performed to date under the contract was made to the project Technical Advisory Committee on October 27. Powerpoint slides summarizing work on the various tasks under the contract were prepared, and paper copies of the draft report and user manual for the unpaved road emission impact spreadsheet tool were produced for the meeting. At the meeting, this information was presented and recommendations for modification of the spreadsheet tool were accepted. Additional sources of data used in the report, such as the PM_{10} emission contribution from vehicle wear, were identified. Subsequent to the meeting, several of the changes proposed were incorporated into the spreadsheet model.